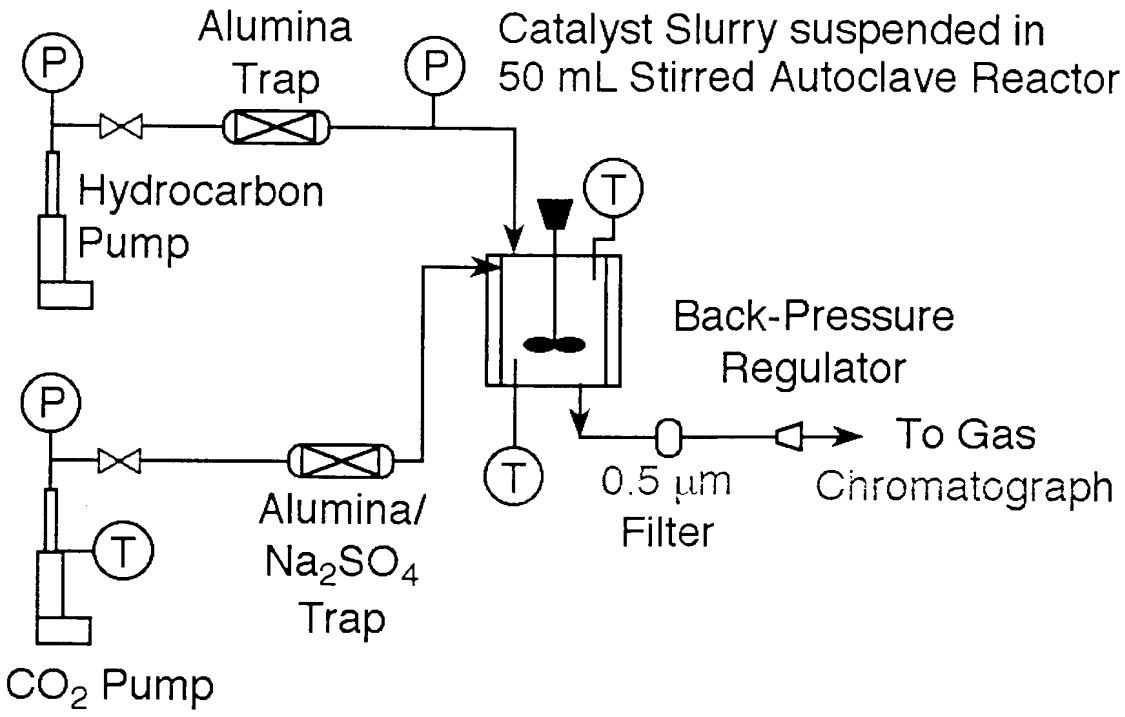
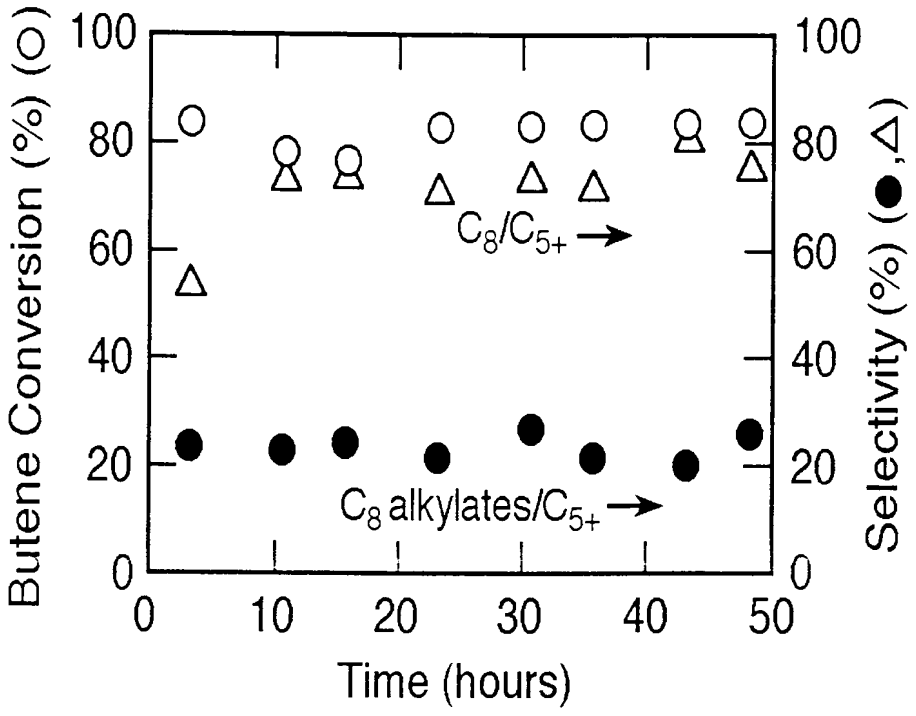
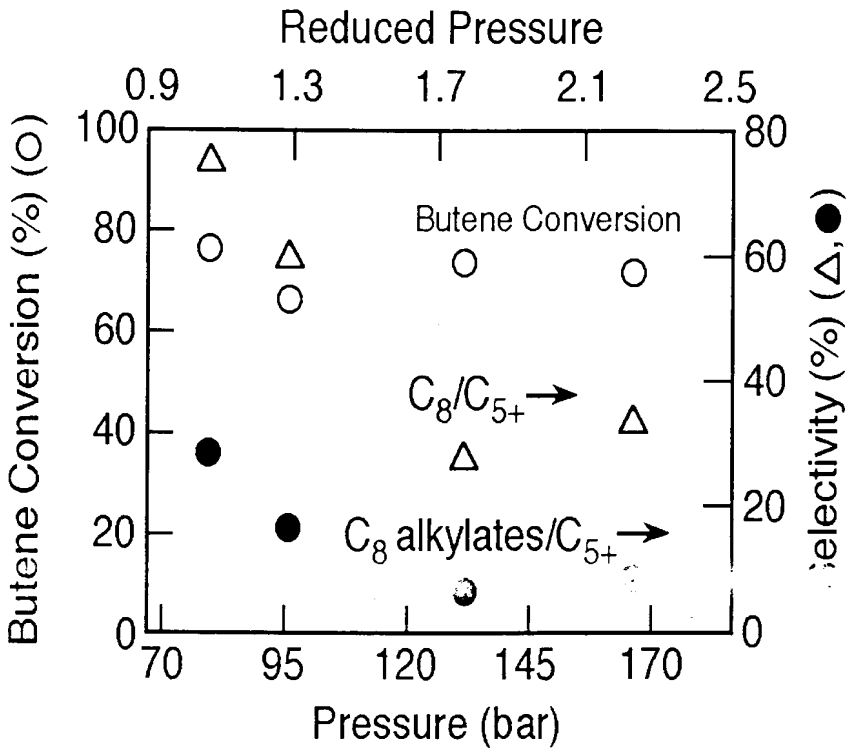

Alumina
Trap
Catalyst Slurry suspended in
50 mL Stirred Autoclave Reactor
Hydrocarbon
Pump
Back-Pressure
Regulator
To Gas
Chromatograph
0.5 μm
Filter
Alumina/
Na_2SO_4
Trap
CO_2 Pump

Figure 1



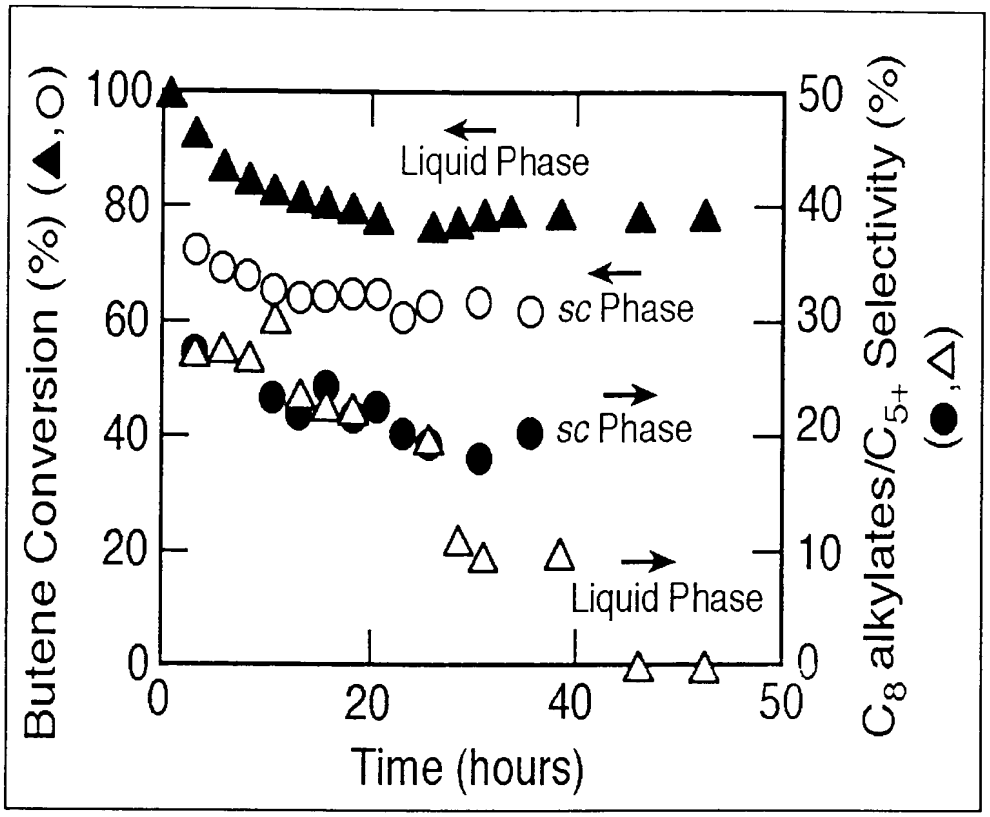
Steady alkylation activity on SAC-13 catalyst. 80 bar, 368 K, 0.05 h^{-1} OSV, I/O=5, CO_2= 70 mole %.

Figure 2



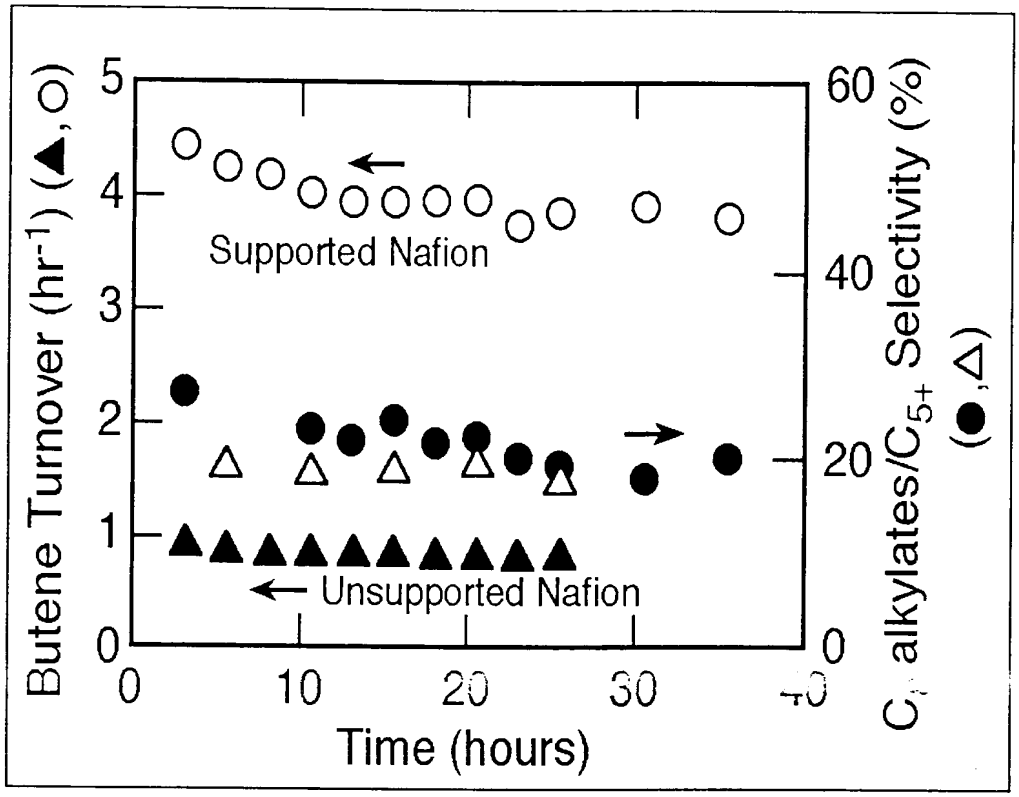
Pressure tuning effect on alkylation activity. 368 K, I/O=5, 0.05 h^{-1}

Figure 3



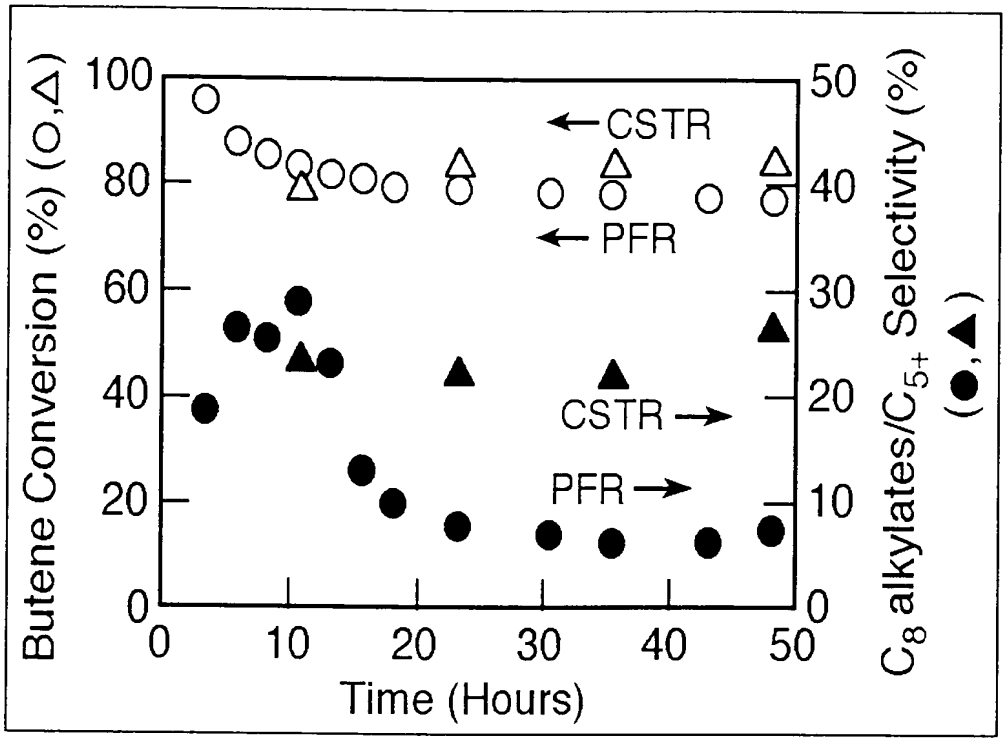
Liquid (26 bar) *vs.* supercritical phase alkylation (95 bar, 70 mole% CO_2) on SAC-13. 368 K, 0.05 h^{-1} OSV, I/O=10.

Figure 4



Supported (SAC-13) vs. unsupported Nafion® catalysts. 80 bar, 368 K, 0.05 h^{-1} OSV, I/O=5, 70 mole% CO_2.

Figure 5



Effect of reactor configuration. 97 bar, 368 K, 0.05 h^{-1} OSV, I/O=10

Figure 6

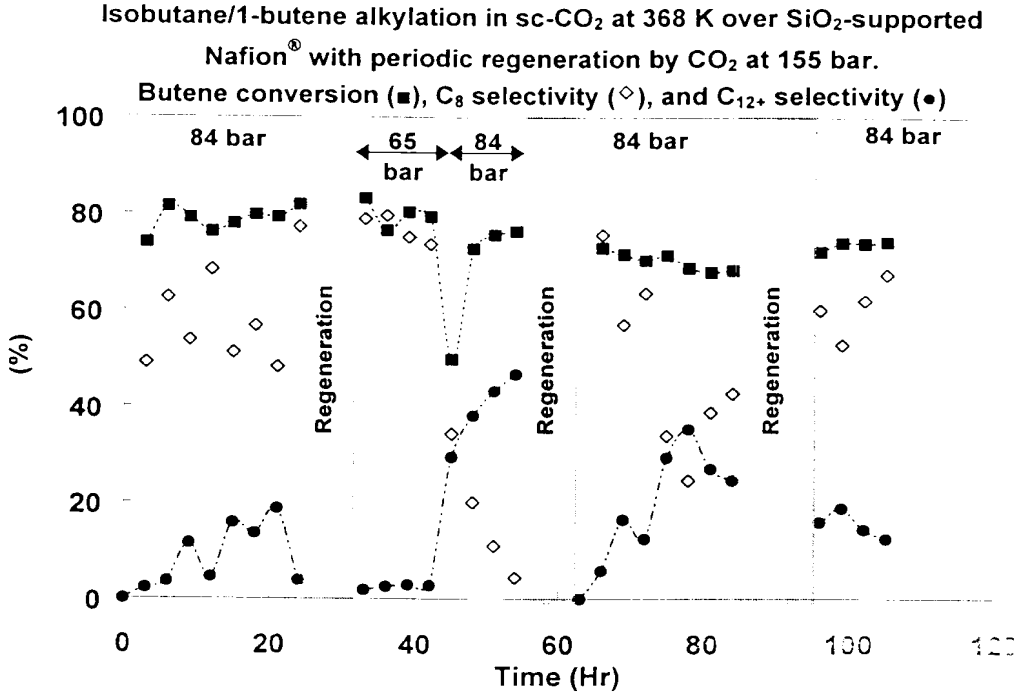

Isobutane/1-butene alkylation in sc-CO2 at 368 K over SiO2-supported
Nafion® with periodic regeneration by CO2 at 155 bar.
Butene conversion (■), C8 selectivity (◇), and C12+ selectivity (●)
84 bar
65 bar
84 bar
84 bar
84 bar
Regeneration
Regeneration
Regeneration
(%)
Time (Hr)
0
20
40
60
80
100
120

Figure 7

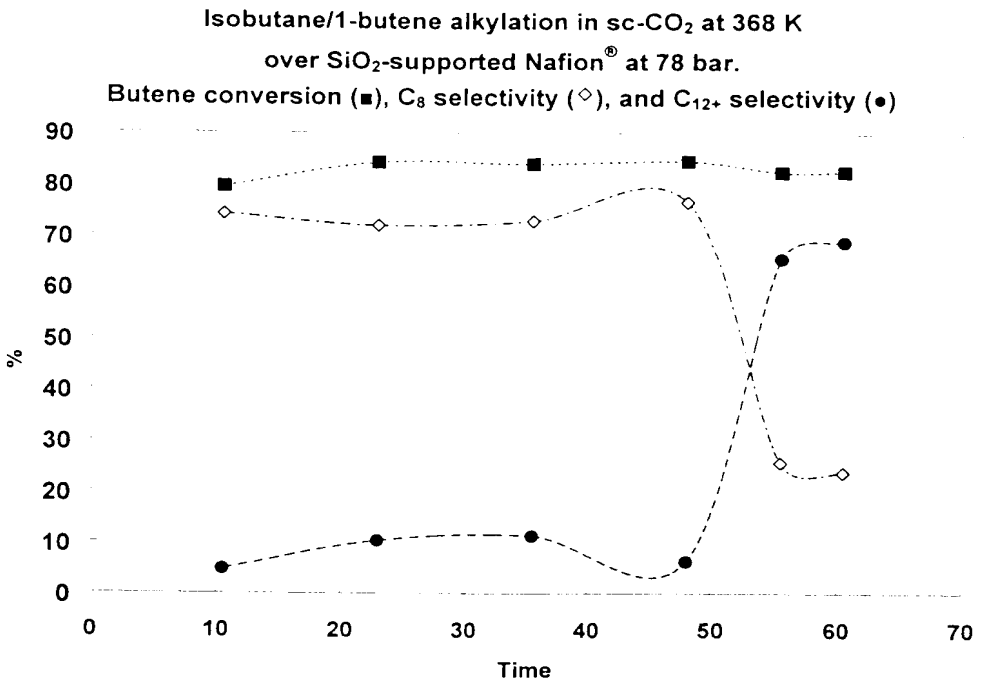

Isobutane/1-butene alkylation in sc-CO2 at 368 K
over SiO2-supported Nafion® at 78 bar.
Butene conversion (■), C8 selectivity (◇), and C12+ selectivity (●)
90
80
70
60
50
40
30
20
10
0
%
0
10
20
30
40
50
60
70
Time

Figure 8

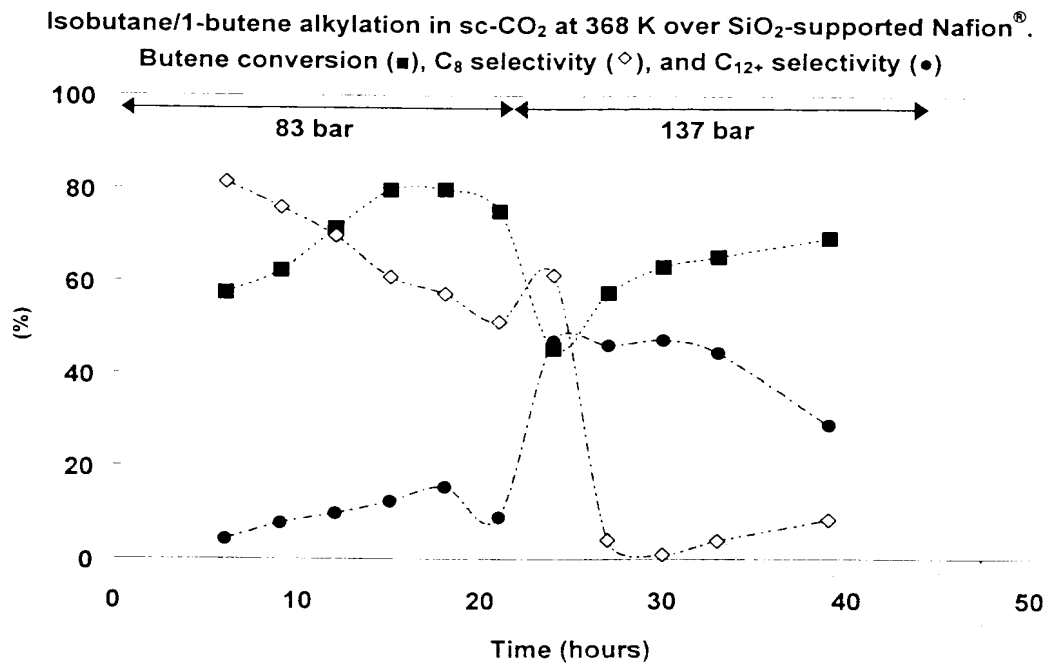

Isobutane/1-butene alkylation in sc-CO2 at 368 K over SiO2-supported Nafion®.
Butene conversion (■), C8 selectivity (◇), and C12+ selectivity (●)
100
83 bar
137 bar
80
60
40
20
0
(%)
0
10
20
30
40
50
Time (hours)

Figure 9

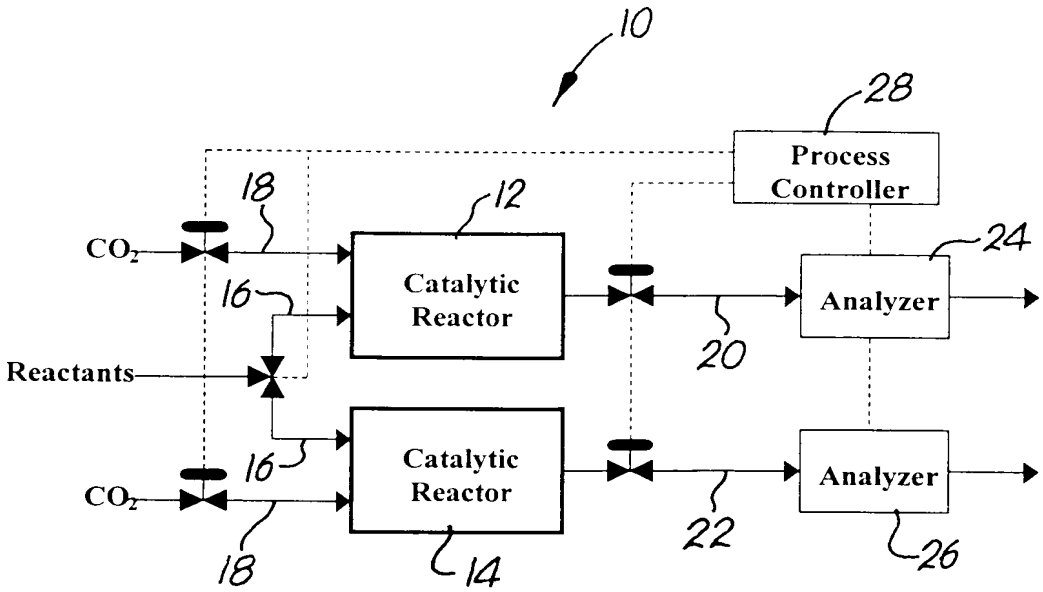

10
28
Process Controller
18
12
CO_2
16
Catalytic Reactor
24
Analyzer
20
Reactants
16
Catalytic Reactor
CO_2
Analyzer
22
18
14
26

Figure 10